

MAY 22, 1922

AVIATION

VOL. XII. NO. 21

Member of the Audit Bureau of Circulations

CONTENTS

Editorials	591	Brief Review of Aeronautics in Italy	603
Inauguration of Hudson Airport	592	Kentucky Encourages Aviation	604
Some Facts Regarding the Air Mail Service	592	Lift and Drag Effects of Wing Tip Rake	604
Organization Plans of the N.A.A.	593	Spain Wants Aircraft	604
Civil Aviation in the United States	593	Foreign News	604
Los Angeles Notes	595	Army and Navy Air News	605
Northwest Aeronautical Society	595	Coming Aeronautical Events	607
Aeronautical Standardization	596	Baltimore Air Meet, May 30	608
The Irwin "Meteorplane"	597	Mechanics' Summer Course	608
Origin and Possibilities of "Curriculum"	602		

THE GARDNER, MOFFAT COMPANY, Inc., *Publishers*

HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

Subscription price: Four dollars per year. Single copies ten cents. Canada, five dollars. Foreign, six dollars a year. Copyright 1922, by the Gardner, Moffat Company, Inc.

Issued every Monday. Forms close ten days previously. Entered as second-class matter Nov. 22, 1920, at the Post Office at Highland, N. Y., under act of March 3, 1879.

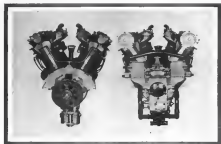
THOMAS-MORSE AIRCRAFT CORPORATION

CONTRACTORS TO U. S. GOVERNMENT

ITHACA.



NEW YORK



Safety Permits of No Compromise

Safety in Packard Aircraft Engines is assured by locating the carburetor at the bottom of the crankcase which makes it impossible for the engine to catch fire through back-firing of the carburetor.

PACKARD MOTOR CAR COMPANY, DETROIT, U. S. A.



PACKARD

Ask the man who flies one

L. D. GAMMA
PRESIDENT
W. D. MORTY
VICE-PRESIDENT
W. L. DEMAY
TREASURER
COM. J. W. HALL
EDITORIAL MANAGER

Vol. XII

MAY 20, 1935

LAMAR & ORRY
EDITORS
VINCENT E. CLARK
EDWARD F. WARDEN
RALPH H. UPSON
CONTRIBUTING EDITORS

No. 22

AVIATION

Hudson Airport

A CENTRALLY located airport which New Yorkers could reach by means of the existing rapid transit facilities has for years been considered one of the greatest necessities of our aviation. The various flying fields situated in Long Island and New Jersey which have so far been used as the aerial terminals of New York all have the drawback of being too far from the center of the city and necessitating complicated transportation to the fields, with transfers from subway to railroad, thence to motorbus or street car, and from the latter to the field. The same situation obtained with regard to airplane terminals, the stations at Flushing, Port Washington, being points in the case. The net result of this situation was that, it being nothing short of an expedition to reach a flying field in the neighborhood of the city, the average New Yorker went to an airport only on exceptional occasions, such as when a flying meet was announced. And even then inadequate or complicated means of transportation kept many thousands away.

The inauguration, by Accessways Airways, of Hudson Airport, at 79th Street off Riverside Drive, marks a happy chance and an important improvement on New York's airport situation. The new airport is only three blocks from the nearest subway station, and offers besides a complete exchange office, necessary facilities such as sheltered waiting rooms, telephones, etc. Thus the awaiting aerial passenger is enabled to reach his home or office in no more time than it would take him from a railroad terminal or a steaming post.

Better, then, is an improvement which should make air transport appear much more strongly to such as a hobby to get somewhere than has been the case before. Indeed, it seems futile to save any bit per cent of the time of travel by using aircraft and then lose half of the gain by poor terminal facilities. This is particularly true with respect to comparatively short flights, for there loses in time in terminals often nullifies the whole advantage of the fast transportation provided by aircraft.

Hudson Airport has the further advantage of enabling the not-to-fly public to see from the most convenient vantage points afforded by Riverside Drive, the evolution of flying boats engaged as a public service. By watching aircraft come and go, and take on and discharge passengers in the crowd's manner of steamships, the outlook of the man in the street is bound to be considerably modified. Aircraft will assume in his eyes the role of merely another means of fast conveyance, and once that attitude becomes rooted, confidence in public air transport will follow as a natural consequence.

Now that airplanes have obtained the legal terminal in New York City, there still remains the question of a centrally located airport for land machines.

Civil Aviation Statistics

CONSIDERABLE interest attaches to the statement of civil aviation in the United States which the Aeronautical Chamber of Commerce recently submitted to the Department of Commerce. The report, which is reproduced in this issue, shows conclusively that aircraft engaged in commerce, when operated by responsible firms who know the value of safe flying and efficient maintenance, suffer from a completely small number of accidents. It also shows that the vast majority of accidents occur in connection with innocent flying, that is exhibitions and joy riding furnished by enterprises which lack the means of securing proper maintenance and also lack judgment as to what does and what does not constitute safe flying. Finally, it indicates that the lack of suitable airports, emergency fields, weather forecasts, markers, etc.—in short all that goes to make up that complex problem known as "ground organization"—is to be blamed for all accidents that are not to be imputed to lack of judgment.

We cannot help but wonder that, lacking federal legislation there should have been so few accidents during the twelve months under review. That this should be so is perhaps due less to improvements in the airplanes themselves—most of them as yet have carried over products—that is a growing realization as the part of aircraft operators that it pays as the long run not to take chances.

And taking chances does not merely mean misstepping into a field a hundred yards square and bordered with trees. It also means going up without being certain that every part, every tank, every nut and every pin, in brief everything, is in the right place and in the right condition. In this connection, J. E. Whitbeck, Superintendent of the Air Mail Service, told us instructive story at the last Accessways Executive's Luncheon. Some time ago the Air Mail instituted a rigid inspection system in which every one of their ships was subjected before every flight. After a certain time the pilots began to complain that this system was merely red tape and that it did not have any practical value. To convince the firm of the contrary, Mr. Whitbeck agreed to call off the "system" for a week, so the results would speak for themselves. The result was that whereas there had been no forced landing for more than the inspection system was in operation, the week of operation without the system produced four forced landings. The lesson was so obvious that there was no more complaining about the inspection service, which was reintroduced.

The record of safety and reliability established by the Air Mail during the past year, with no fatal accidents in operation and 95 per cent of the scheduled flights completed, affords by the way the best verification of careful maintenance.

Inauguration of Hudson Airport

Brilliant Demonstration of Public Air Transport
Furnished by Flying Boats of Aeromarine Airways

Hudson Airport, a sheltered airplane anchorage situated on the Hudson at the foot of 78th Street, New York, and belonging to the city, was inaugurated on the afternoon of May 14 by Aeromarine Airways, who are going to use this station as the terminal of their various services radiating out of the city.

On the occasion of the inauguration the company entertained a large number of guests on board the steam yacht *Wadena* which is tied up to the 79th Street pier and acts as a moorship to the "Black Hawk" airplane and flying boats. The yacht is fitted with an attractive and comfortable cabin which will serve as a lounge room, while additional quarters are available for use, so passengers intending to embark, and their relatives and friends, will find shelter, with telephone service. The equipment of the airport also includes the tender service, an emergency class of 10 knots per hour, which will be used to push supplies, spare parts, etc. for all emergencies. Several fast motor launches, for service between aircraft and the moorship, complete the equipment of the Aeromarine installation. The telephone number of Hudson Airport is Collector 9412.

The Black Hawk fleet turned out in strength for the inauguration, there being present the twin-engine airplane *Jason Morse* (pilot George W. Cobb), and *Meridian* (pilot J. Zimmerman), the six-engine flying boat *Vanderbilt* (pilot Ed Mashek), *Edmore* (pilot D. C. Richardson) and *Archambault*, and an Aeromarine Model 50 three-engine flying boat fitted with the Aeromarine CB 150 hp engine. With the exception of the latter ship, which was painted black all over, all the Aeromarine boats wore their characteristic coat of white paint with a black tail, which makes it so easy to identify them.

As before the inauguration of an airport, the ceremony consisted mainly in giving the guests a practical demonstration of only one item flying by leaving them to go up on a sightseeing tour down to the Battery and return. There was an eager crowd to avail itself of this opportunity, and not only was serious and business-like but also a fair number of passengers, each ship making several trips, so large was the attendance.

Among the guests of the Aeromarine Airways who flew from the exhibition were Vice D. H. Roberts, representing Admiral W. A. Moffett, Chief of Naval Aviation; Maj. A. N.

Kriegel, United States Air Service, aide to General Billings; Maj. D. B. McFarland and Comdr. E. F. Mania, with the following staff officers: Comdr. C. F. Jones, Louis Comdr. C. E. Holman, Lieut. Comdr. C. E. Miller, Lieut. H. S. De Land, R. H. DeLeon, representing Captain Vorhies, commandant of the district.

Also present were, Lieut. Comdr. Monroe for the Army, Lieut. Comdr. Commissioner, Felipe Taborda, Cuban Consul General; Murray Halbert, President of the Board of Admiralty; Dock Commissioner J. B. Delaney; Mr. and Mrs. T. J. Oakley Hainsdale, Miss A. Holman, Miss Emily Chas. M. L. J. Driggs, Miss Margarette Hyatt and Frances E. Morrow.

The largest passenger list carried by any of the ships in that of the *Meridian*, which carried twenty-seven passengers, mostly high school girls, from the Aeromarine station at Keyport, N. J., to Hudson Airport. Engle M. Uppen, president of the Aeromarine Plane and Motor Corp., was also among the passengers. Altogether 147 passengers were taken up.

The reception committee on board the ship *Wadena* on occasion of Engle M. Uppen, owner; Charles F. Bolden, president, L. B. Smith, general manager; Harry Brown, assistant manager; F. Rodgers, Commodore; and Ed E. O'Brien, assistant Commodore Aeromarine Airways.

The arrangements provided for handling the airplanes were in every way excellent and there was not the slightest incident to mar the success of the inauguration. The passengers were swiftly and smoothly taken off the *Wadena* by a motor launch and transferred on board the flying boats they were assigned to. The handling of the ships, both aloft and in the air, was likewise first class and gave the audience a glimpse of the silent efficiency which distinguishes Airways from the splendid record of safety they have established in the history of American civil aviation. The drag of a strong side tide made the handling of the ships on water a delicate operation, which required all the skill of the personnel in command. A word should also be said in commendation of the Aeromarine navigation owing to whose conscientiousness and their way to engine trouble or any reluctance on the part of the engine to start on the first swing of the starting handle. The *Meridian* failed to start twice but the high expert in charge effected in the operation.

As before the inauguration of an airport, the ceremony consisted mainly in giving the guests a practical demonstration of only one item flying by leaving them to go up on a sightseeing tour down to the Battery and return. There was an eager crowd to avail itself of this opportunity, and not only was serious and business-like but also a fair number of passengers, each ship making several trips, so large was the attendance.

Some interesting and not generally known facts regarding the Mail Service of the Aeromarine Airways are given by J. E. Whitlock, superintendent of the Air Mail Service. Mr. Whitlock, who was introduced to these striking achievements by E. R. Rhyne, organizer of these highly successful missions, stated that the safety and reliability of the Air Mail Service was showing a constant improvement, and that the operating costs were also decreasing at a slow but steady rate. To illustrate the former, Mr. Whitlock said that during the last twelve months the total damage suffered by the planes amounted to only \$2,000. This striking result was due to the fact that by creating a rapid inspection system serious mechanical troubles have to all practical intents been eliminated. On certain serious mechanical troubles, however, there has not been a single delayed flight for many months and during the last year 85 per cent of all scheduled flights was completed. Of these delayed 5 per cent were due to weather and to flying, while only 1/10 per cent were caused by mechanical troubles, the remainder being accounted for by minor delays.

That the Air Mail Service is now looked upon by pilots as a steady job is best shown by the fact that there has been no change in the living personnel during the past year. The pilots fly on the average three days per week and are paid a "base salary" of \$2,000 a year, plus a flying pay in proportion to their flight mileage. The flying pay varies from 5 cents to 7 cents per mile according to the geographical nature of the route.

An effort to the earnings which are possible from commercial aviation, the operation on a credit and business basis, Mr. Whitlock gave the operating expenses and possible increase of the New York Chicago service during last March. He stated that the cost of the service for the month of March was \$10,000 for the month, during all costs, including overhead, depreciation, interest on capital investment, etc.

Organization Plans of the N.A.A.

Admiral Fullam is Touring Country Organizing Districts of National Aeronautic Association

The plans for the organization of the National Aeronautic Association in District during the next week on the full are progressing rapidly.

Bartholomew W. F. Fellers, U. S. N. (retired), is making a tour of the United States giving lectures, showing the wonderful strides aeromarine has made and organizing the districts and states on behalf of the new association. His notes are as follows:

Admiral May 7, 1. Birmingham, May 10, 2. New Orleans, May 12, 3. Philadelphia, May 14, 4. San Antonio, May 17, 4. Los Angeles, May 19, 5. San Francisco, May 20, 6. Portland, Ore., June 2, 7. Seattle, June 3, 8. Spokane, June 5; 11. Whiston, June 10, 12. Chicago, June 11, 13. St. Paul, June 12. Admiral Fullam is attempting to have every city organized in an hour, which would mean of representatives from each society or organization interested in aviation. Chicago has had an Air Board for some time now and it has given a confident response for getting results. Admiral Fullam attended the St. Louis, Mo. Convention last March and it is a confident promise to direct the other districts in their organization work.

The operators of the N. A. A. are now "not to let other countries get ahead of this nation in the air. They say that the world powers are today financially embarrassed that they cannot support large standing armies and navies, and that the civil emergency will be worked with a great efficiency in the air."

Civil Aviation in the United States

Aeronautical Chamber of Commerce Memorandum
On Twelve Months Operation of Civil Aircraft

Three deficiencies operate to the serious embarrassment of American aviation—meager capital, inefficient terminal facilities and popular doubt as to reliability. The correction of these deficiencies, and the consequent opportunity for the rapid growth of aerial transport, depend upon legislative and reasonable control through an aerial code.

In a recent issue of Commerce Weekly, organ of the National Bank of Commerce of New York, it was declared: "Five agencies may be expected to give a certain push to the air transportation industry essential to any industry which must appeal for credit and for investment capital. This first is efficient air transportation can not be said to be a business basis. From whatever point of view the air is an important industry, it is one which should be the center of any law in the first essential step toward the development of commercial aviation in the United States."

The experiences of the inland waterways and the railroads in other business development, which have formed their, or is struggling seriously for the efficient control of available ships, a control which must prevent monopoly and, in turn, public burden, point the way for the sound economic treatment of the airport problem. The establishment of reasonable laws for the management of all aviation, and the national industry in time of need, is a public responsibility, which, if neglected now, will invite difficulties which a few years similar to those in which the waterways and the railroads now find themselves.

Errors in Number of Airports

At the close of 1928, operating reports showed the existence of 128 terminals of all classes, of which 40 were in Canada,

the air side side aiming to strike as suddenly and as quickly that the other will be unable to mobilize its civilian army and navy resources.

But not only for national defense do they form the power of the airplane. Involving the transportation of speedy transportation in any emergency or state, they are moving to build up new industries relying on the speed of the airplane and requiring the new medium of inter-communication.

Although the airplane was created in the United States, there is no denying thought in the country. Here and there are found sporadic efforts on the part of local clubs and societies to develop the power but most are working at cross purposes. The time is now ripe for an association that will join and with a united front for the far-reaching air power in the United States. The sponsors of this movement say that this body must be entirely independent and they are giving a great deal of thought and hard work to meeting a democratic, non-partisan, representative association that will not reflect the wishes of any particular community but speak in the behalf of the nation as a whole, so that the necessary legislation, the necessary airways, routes and landing fields, can within as short a space as possible be brought into existence. With these well established air routes planned and with the over-head taken care of as it should be, air travel will be a clean, convenient and rapid will become every-day and common place, safe and regular.

and three others devoted to striking experiment, leaving a net of 120 in the United States. Of this number, probably twenty could be classified as seaplane bases.

At the close of 1921, the operating reports showed a total of 100 air terminals in the United States, of which 40 were in Canada. This is an increase of twenty-six over the preceding year. Of the total number thirty were classified as seaplane bases, and others were public owned or controlled. The 100 terminals available to commercial aircraft represent the facilities for 400 machines without regard to geographical or business requirements. The wonder is that there has been no much paid flying time so far.

Key Information is Obtained

In preparing the data for the Department of Commerce, the worst obstacle encountered is research and analysis was the lack of official machinery which is to obtain thorough and authentic information. Two sources were open—confidential data (as identification) from the established companies making operating reports; and gross totals, covering the general field. It is important to state at this point and to be understood that the gross totals (which with the exception of less than half a dozen failures) refer solely to the paper filed and that gross totals do not include the unreported aircraft pilot encounters and emergency work of the designer in flying. One hundred twenty-five established companies, operating from 500 to 600 two and three-place machines, made 230,736 flights, covering 2,097,245 miles and carrying 122,412 passengers in the twelve months Oct. 1, 1928—Oct. 1, 1929. In making their reports, these companies used standard in

Some Facts Regarding the Air Mail Service

Some interesting and not generally known facts regarding the Mail Service of the Aeromarine Airways are given by J. E. Whitlock, superintendent of the Air Mail Service.

Mr. Whitlock, who was introduced to these striking achievements by E. R. Rhyne, organizer of these highly successful missions, stated that the safety and reliability of the Air Mail Service was showing a constant improvement, and that the operating costs were also decreasing at a slow but steady rate. To illustrate the former, Mr. Whitlock said that during the last twelve months the total damage suffered by the planes amounted to only \$2,000. This striking result was due to the fact that by creating a rapid inspection system serious mechanical troubles have to all practical intents been eliminated. On certain serious mechanical troubles, however, there has not been a single delayed flight for many months and during the last year 85 per cent of all scheduled flights was completed. Of these delayed 5 per cent were due to weather and to flying, while only 1/10 per cent were caused by mechanical troubles, the remainder being accounted for by minor delays.

Commercial Machines

The use of special hardware, which was likely to be avoided during the World War when everything was hard to get, should not be tolerated in normal times. The greatest obstacle to this report lay in the fact that the aeronautical industry as a whole was not used to the idea of standardization of hardware it adopted. Hence the aeronautical industry failed to specify its hardware in the commercial designation and size in the same manner as was used in the original industry. This was a serious type of error that was made in all kinds of classes. This practice is particularly harmful when an experimental plane built from whatever screws, nuts, washers, etc., are most conveniently available is suddenly turned into a production. This is a costly error. The original hardware only result in various delays until the entire hardware design has been revised to meet the available supply. The universal adoption of hardware standards would avoid this. The committee as an example of the standardization of hardware.

Wood Screws—Brass wood screws should generally be used in preference to steel wood screws. Brass wood screws should be of two types—round head and flat head. The use of suitable lengths of numbers 2, 3, 4, 5, 6, 8, and 10 is standard is recommended. Steel wood screws whenever used should also be either flat or round head.

Machine Drivers—Machine screws should be either of brass or steel, round or flat head. The use of the fine series of thread of the National Screw Thread Commission is recommended. Nos. 4-48, 6-40, 8-36, 10-32 are recommended for standard work.

Size: Eucalyptus Pins.—These pins furnish a neat finish, and are useful in riveting very small parts. Eucalyptus pins should be specified by diameter in BWG and length in inches. Nos. 18 (0.0418 in.) BWG is a typical standard diameter to be used in lengths varying by eighths of an inch from $\frac{1}{8}$ in. to 1 in.

Steel Wire Nails—These are the most useful nails in every construction and all similar fabric. They should be specified by diameter in BWG and length in inches. The use of Nos. 16 (0.043 in.) and 18 (0.041 in.) is recommended.

Steel Wire Nails—Steel wire nails should be specified as 3 penny, 4 penny, etc. Commercial hardware catalogs give the standard diameters and lengths.

Steel Wire Brads—These are particularly useful in the pattern shop. They should be specified as BWG for diameter and length in inches. Nos. 25 (0.049 in.) and 16 (0.065 in.) are recommended for general use.

Copper Wire Nails—A very useful nail in hull framing, and one which can be used in riveting over copper bottoms. This nail should be specified in the same manner as the steel wire nail. The use of 3, 5, 7, 8, and 12 penny nails is recommended.

Brown Field Taper Check Nuts—These nuts find their chief use in fastening planking on hulls and boats. They should be specified by diameter in SWS and length in inches. Nos. 35 (0.640 in.) and 36 (0.692 in.) are recommended diameters for standard use.

Copper Tacks—When required copper tacks should be specified by weight in ounces. 2, 5 and 10 oz. tacks will be required for general use.

size. Heads—These should be of three forms—fat head, roundhead lead, and round head. Diameter and length both given in fractions of an inch are used as designations. $\frac{1}{2}$ in. and $3/16$ in. are best for standard use.

Copper Finners Nivols—These are metallic lined and are used for high construction other than aluminum. They should be specified by size in ounces and pounds. 8 oz., 12 oz., 1 lb., 2 lb., 4 lb., and 8 lb. would provide an ample range of sizes.

Copper crystals—Copper sheet crystals may often be used to great advantage in fastening various thin sections of wood together, and in placing stiffeners on weaker sections. These crystals are sheathed lengths of copper tubing with a hard finish on one end. No. 24 (0.025 in. BSW) will be found a satisfactory thickness with an outside diameter of approximately 3/16 in.

Musculinaceae.—All such parts as greenlets, living hooks, snap fasteners, small cycles, and many others too numerous to mention can be bought commercially in a range of sizes suitable for aircraft needs. The following table is arranged

as a summary of standard designations of commercial land.

[illegible]

Pollens

For fixture controls the use of a molded insulate spacer pulley with a graphite impregnated core is to be preferred to any of the metal pulleys. These pulleys are used with a similar spacer placed on the core through which the bolt centers.



Beautiful silver model of the Currier-Yang tower, belonging to the Yang Department

The Irwin "Meteorplane"

Small Single-Seater of Interesting Design Is Fitted with a 15 hp. Air-Cooled Engine



The Irons "Metacarpus" and J. Fulton Irons, the contractor. The close-out loss of the Mills ship which runs with 16 hp. only, are noteworthy.

The Irwin Airmann Co. of Sacramento, Calif., recently put on the market a small sport machine called "Motorplane" Model NT, which embodies several interesting features.

designed to meet the demand for a small light weight airplane of conventional design that the average non-enthusiast could afford to have and operate.

This little plane has a quick get-away, good climb and a fair high speed, and—at the same time—a very low landing speed, such as insures the greatest degree of safety. Combined with these qualities, the design and construction endow her with light weight, yet the factor of safety at any point of the whole machine is more than 5. The power loading is 25 lb., while the wing loading is only a little over 10 lb. per sq. ft.

Mane Phras—Spars are of spruce and are hollow. Struts between phras are of straightened cotton and are built up of 10-15 ply wood and are E-shaped, thus doing away with all internal stress wires. Another feature is that the phras slide along the body, thus making it an easy matter to get the machine in perfect balance. The rib webs are of yellow pine and the cap strips are of spruce. The Irova No. 4 stretched in steel. The dynamical stability of the phras is almost the same as the Dynaflex 22.

Fittings—The bowlegs is of good structural form with ash lagueron. Its wooden frame is of box-joist construction, and four 3-ply wood panels hold the body in shape, while the whole body is bound by wires from the engine panel to the ladder post. The nose is covered with sheet metal and the remainder is covered with cloth. Smooth and varnished.

Undercarriage—This is of steel, yet simple construction and consists of two wide sprung members that form an A, which is held to the body at three points. This A is slotted at the ends to receive the rubber sprung axle which carries two 20 x 3 in. rubber-tired wheels.

Tail Group—The empennage is composed of a non-lifting horizontal stabilizer, to which the horizontal rudders are hinged. The vertical surface is of sufficient area to insure complete control in handling the machine on the ground.

Gyroscopic—Lateral and longitudinal balance is operated by stick control. The rudder is operated by the foot bar. Lateral control is obtained by two ailerons in the top plane and their

effect is immediate in answering to the slightest movement of the stick.

Engine Group—An air-cooled 2-cylinder engine of 18 hp drives a 4 ft. 11 in. compressor of 3 ft. pitch at 1100 r.p.m.

GENERAL INFORMATION

Upper-epimeral space	(57 sq. cm.)	23 ft. 10 in.
Upper-lower space	(48 sq. cm.)	22 ft. 1 in.
Overall length of machine		8 ft. 100% in.
Overall length of machine		13 ft. 8 in.
Depth of wing shield		57 in.
Gap between wings		20% is to 34 in.
Angle of incidence of upper and lower wings		8 deg. 30 sec.

Hydrophilic angle (lower planes only)	5 deg. 30 min
Wing curve	17 mm No. 4
Number of alarons (on upper plane only)	2
Staircase	6 sq. ft.
Fur	19 sq. ft.
Vertical rubber	6 sq. ft.
Horizontal rubber	8 sq. ft.

WEIGHTS

Net weight machine empty	209 lb.
Weight of fuel	38 lb.
Weight of pilot	140 lb.
Load landing per sq. ft.	5 1/2 lb.
Gross weight machine loaded	394 lb.
Power loading per hp. (with 35 hp	

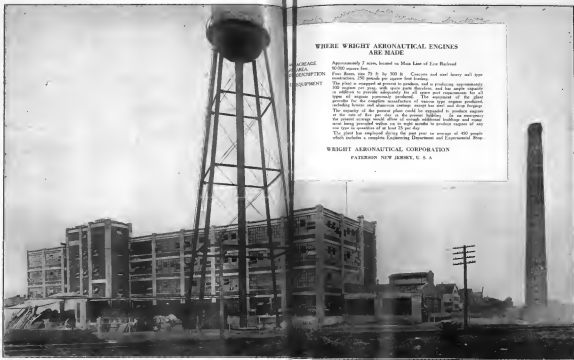
Maximum speed	56 m.p.h.
Minimum speed	32 m.p.h.
Rate of climb first minute	900 ft.
Climb in 30 min.	3,000 ft.

Chamber in 10 mm.	101.10000000000000	0.00000000
Outside in —————	100.00000000000000	0.00000000
Inside in —————	100.00000000000000	0.00000000
Chilling angle —————	100.00000000000000	0.00000000
Range of action —————	100.00000000000000	0.00000000

The Metaplane is sold either complete with engine, or in knock-down condition. Complete sets of blueprints for the construction of the machine are also sold.

SPECIES		SYNOPSIS	
Rough-scaled planthopper (18.5 g, 3.1 in.)		23 ft. 10 in.	
Span—lower plane (57 g, 31 in.)		29 ft. 2.1 in.	
Overall length of machine		28 ft. 10.0% in.	
Overall length of machine (with propellers)		31 ft. 9.0% in.	
Depth of wing chord		15 ft. 9.0 in.	
Gap between wings		33.5% in. to 34 in.	
Angle of incidence of upper and lower planes		10 to 15 deg.	
Pitch		10 to 15 deg.	
Dihedral		10 to 15 deg.	
Wing curve		10 to 15 deg.	
Number of talons (on upper planes)		2	
Stability		10 to 15 deg.	
Fin		10 to 15 deg.	
Vertical stabilizer		10 to 15 deg.	
Horizontal stabilizer		10 to 15 deg.	
Net weight machine empty		500 lb.	
Weight of fuel		25 lb.	
Weight of pilot		140 lb.	
Left landing gear		250 lb.	
Right landing gear		250 lb.	
Power loading per sq. ft. (with 35 hp motor)		50 lb.	
Maximum speed		50 m.p.h.	
Minimum speed		30 m.p.h.	
Rate of climb first minute		300 ft.	
Climb in 35 min.		2,500 ft.	
Climb in 1 hr.		5,000 ft.	
Landing in 1 hr.		110 ft.	
Gliding angle		1 in 9	
Range of action		10 to 15 deg.	

The Metoplane is used either complete with engine, or as a glider, or as a motor glider. Complete sets of blueprints for the construction of the machine are also available.



WHERE WRIGHT AERONAUTICAL ENGINES ARE MADE

ACREAGE AREA DESCRIPTION EQUIPMENT

Approximately 7 acres, located on Main Line of Erie Railroad

50,000 square feet

Four floors, size 75 ft. by 300 ft. Concrete and steel heavy wall type construction, 250 pounds per square foot loading.

The plant is equipped at present to produce, and is producing approximately 300 engines per year, with spare parts therefor, and has ample capacity in addition to provide adequately for all spare part requirements for all types of engines presently produced. The equipment of the plant provides for the complete manufacture of various type engines produced, including boxes and aluminum castings except box steel and drag forgings.

The capacity of the present plant could be expanded to produce engines at the rate of five per day in the present building. In an emergency the present storage would allow of enough additional buildings and equipment being provided within an eight months to produce engines of any one type in quantities of at least 75 per day.

The plant has employed during the past year an average of 400 people which includes a complete Engineering Department and Experimental Shop.

WRIGHT AERONAUTICAL CORPORATION

PATERSON NEW JERSEY, U. S. A.

Origin and Possibilities of "Currenium"

Investment Based on Change in Atomic Valency—
Formula Still a Secret—Production Predicted

Dr. Edward Curren of Los Angeles, who has developed the new gas called "Currenium," has prepared for Aviation the following statement regarding it. Curren:

"This gas has been developed through a number of years of research made in the hope of producing a levitating gas for aircraft as good as, if not better than, hydrogen, but without an inflammable and explosive quality, and which might be commercially efficient as well. I became first impressed with the possibilities of aerostatics at Chicago in 1919, and as it changed rapidly at our airport, I was very much surprised to find that the aerostatic gas seemed to be more and more important as an essential in effecting practical travel through the air. I studied only two a great deal and my liking for chemistry and aerostatics probably led me to consider the problem more from the laboratory viewpoint than as a balloonist. At any rate, I began to reason the matter out and as soon as I could, to make experiments.

Atomic Activity and Organic Change

"Then were interesting, but not profitable and not always exactly safe. I had several 'blow-ups' in getting acquainted with the qualities of hydrogen, and I was very much of the belief that a safer gas must be found. Finally, after some years of trying to get at elements, I began to appreciate certain fundamental principles regarding atomic weights and organic changes. Atoms could be made to combine in a more or less constant way, and I began to see the possibilities of aerostatics as a new science. We know, too, that through all material differentiations from a condition of almost diffusion, or ultimate atomization, with the best defects of matter and its motion to its greatest concentration, density and definiteness of action, progression which involves a state of perfection, of limitation, and even down to the state of greatest subdivision of matter, the conditions are the same. In the case of radiation of energy, both in amount and kind, there is no noticeable tendency to invert the greatest quantity of atomic matter, of the highest heterogeneity and of the least relative homogeneity, with the greatest amount of contained energy of parallel heterogeneity. As we ascend the scale of organic developments, the higher we go the greater we find the demand for, and the greater are the quantitative adaptation and redistribution of, radiated forces of increasing heterogeneity, complexity, complexity and intensity. At any rate, as I have said, toward the end of the last century of matter of higher quality, aerostatics, and aerostatics, with the greatest amount of contained and radiated energy having the least amount of least penetrating effect on surrounding and adjoining matter.

Is Hydrogen the Lightest Gas?

"We cannot say doubly that hydrogen is the lightest gas, although we have said that it is the lightest and terminally identified gas. When light from our atmosphere is represented by hydrogen, the concept of gas or elements lighter than hydrogen is rendered obsolete. The spectrum analysis of light from more stellar formations yields similar, or even more double, manifestations in this direction. This would indicate to us that elementary formations and their atomic weights—the type of which are the same—are varied to infinity and beyond the conception of our minds.

"In my investigations I found that the atomic valency may be varied, and also that the effect of one given element on another given element may be determined or determined or even totally destroyed. I found, too, that electricity in the primary sense of all material differentiations and that heat in the secondary sense, also that when such differentiations occur, and when the electrical and thermal conditions are appropriate to matter masses, regardless of whether such con-

ditions may be naturally or artificially released, at various stages of action, phases of progression or states of homogeneity, a transformation of the element is accomplished. This transformation may be said to be permanent well as retained elevated and containing radiated energy enough to induce other corresponding transformation.

"By a method developed from these research results I have been able to vary atomic valency and produce a gas which is both levitating and levitating and which is without danger of inflammable and explosive qualities of hydrogen. It is, as is naturally probable, which is equally as important as an aerostatic as to make it dependable. At present I am pleased in asserting that this gas is fully as aerostatic and as cheap as hydrogen, with added qualities of practical value, but I feel that the process by which I produce it may make use of a lighter gas. It will be feasible to vary atomic weight, that a gas may be produced of even greater lift—has been very definitely so in this I believe to be important. Hydrogen may be hazardous under certain circumstances, and it is desirable to substitute quantities of an aerostatic gas, so it will not be considered safe enough to secure public use. However, it is difficult to produce with sufficient efficiency, and it cannot be produced in all parts of the world under present production methods, then is a limited supply which is restricted to the United States. There is a great need for a gas so safe as being both so aerostatic and so producible anywhere at a cheap rate.

Formula Still a Secret

"It will be readily seen that I cannot give the formula for producing this gas at present, for it is not fully perfected. The demonstration, chemically made, which has been made thus far are not as satisfactory as will be the case when I complete production of this gas. It is not yet ready for use, but I hope will be reached before the end of 1923. It should be possible, however, from what I have outlined, to note the manner in which this gas is produced. Machine in large part already made, and the process is not as expensive as that involved in a burning battery. The materials required may be made available in any part of the world at an expensive rate. Electric power will be necessary for production on an economical basis."

New York Aerial Police

Through an arrangement concluded with the Navy Department, the aviation division of the New York Police Bureau is to receive complete training and equipment as a unit of the naval reserve force. Included in the equipment which the Bureau is to turn over to the unit are four airplanes and two hangars on the shore at Fort Totten.

With the addition of the four new planes the flying equipment of the Police Bureau will consist of nine planes. The other five are light machines and are at the advance at Flushing Heights, N. Y. They are owned by officers of the service.

Inspector John F. Dwyer, retired, who is acting as chief of the Special Deputy Police Commissioner's Bureau, Wardsman, and that there were now 250 young men in the service division, at the Police Bureau, are being instructed at the ground-work of aviation preparatory to taking up air work at the Flushing Heights field this summer.

Although the members of the aviation division are already members of the aerial reserve force, they will wear the police reserve uniforms and participate in various police activities.

Brief Review of Aeronautics in Italy

By Alighiero Biziochi
Our Correspondent for Italy

In Italy the elementary problems of the civil aviation has not yet been solved. Although no study has been granted to the air transport companies, but shortly a bill favorable to civil aviation is to be examined by the Chamber of Deputies. The new law Mantovani, Prince of Salsola, is going to help civil aviation, as appears from several of his statements.

Italian Air Transport Companies

The Italian air transport companies are as follows:

Compagnia di Navigazione Aerea, Ltd.

25, Via Veneto, Rome.

S.A.C.E.A., Ltd.

25, Via XX Settembre, Genova.

Aviazione Aeronautica Compagnia Aerea, Ltd.

25, Via Veneto, Rome.

S.A.C.E.A., Ltd.

25, Via XX Settembre, Milano.

S.A.C.E.A., Ltd.

25, Via Veneto, Rome.

Compagnia per la Navigazione Aerea.

25, Via Veneto, Capitan.

S.A.C.E.A., Ltd.

Compagnia Nazionale Aeronautica.

25, Via della Spina, Rome.

The best organized company is the Compagnia di Navigazione Aerea on account of its capital and the wide experience of its board of directors. Another important company is the S.A.C.E.A., which is also one of the older air navigation companies. Its staff is composed of expert pilots and engineers of the first rank.

Unfortunately, owing to the war of latest years by the Italian government in the civil aviation, none of the above companies operate any line. Their activities are limited for the time being to aerial photography, pay-making, aerial advertising, etc.

In the expectation of government's subsidies the Compagnia di Navigazione Aerea is carrying on a very interesting work, namely the study of many important requirements of civil aviation.

State of the Air Service

Following is the present state of the government air service:

Army Air Service.—The companies (twenty-five squadrons) subdivided in three groups: (a) Fighting Group, (b) Bomber Group, (c) Transport Group.

The number of pilots is rather limited and very many of the machines are obsolete.

Naval Air Service.—The Naval Air Service, too, has very many aircraft of old types. Of the 263 airplanes, which in number, only a very small percentage is composed of up-to-date machines, the other being surplus craft left over from the last war.

Civil Aviation.—Colonial Aviation is in a pitiable state. Here some machines in Italy, the other colonies are nearly without aircraft. In Libya specially the need of aircraft is felt very much to help the colonial services and for the better inspection of that country.

The Aircraft Industry

On account of the aeronautical and general uses the industrial situation is as follows:

The Fiat Co. has declared that it will be obliged to shut down its aviation department for which it spends at the least \$1,200,000 per month.

The Ansaldo Co., after three years of waiting has just received an order for twelve machines of the AS304 type. Caproni Bros. have received an order for two machines

equipped with 450 h.p. engines but they do not think it worth while to open the works again for such a small order.

The Breda Co. expects to receive orders. In the meantime it has received a Caproni type C-40 order for four machines.

The Sestini Co., Sestini expects to receive orders. Only the Savoia Co. and the Savoia Co. are at present actively working, as they are doing business abroad.

Aeronautical Congress

The national events of this year will be very interesting and it is believed that they will surpass those of other countries. In addition to the events recently reported in AVIATION there will be in September on Lake Garda, a competition for the IF-Aerostatic Cup, while in Venice the Adriatic Cup and the Grand Prix of Venice will be completed.

In Rome an important aeronautical meeting will take place in September on the occasion of the International Congress for the Aeronautics which this year will be held in Rome.

Flying School for the Air Service

The War Ministry has started training for the instruction of the new officers of the Army Air Service. The company undertaking the School will be obliged to use for the instruction Aviatik, Gothaer, Hansa and Nieuport airplanes.

New Type of Parachute

A new type of parachute (post-parachute) constructed by the Stabilimento Costruzioni Aeronautiche di Stato (Government aircraft factory) for use with life balloons has been experimented lately. The tests were successful.

New Aircraft Cases

In the Korinthia Works of Milan a new type of cases for aerial and ground photography, which was invented by the Lieutenant Storti, an Italian officer, is under construction.

This camera is precise, very simple and easily used. It affords the possibility of carrying land and water only through the lens at any oblique altitude, that is to say without the help of the water and land work. Preliminary tests of an experimental camera were successful.

The camera is being built by the S.A.I.A., Ltd. (Societa Anonima Italiana Aeronautica) 2, Via Sella, Rome.

Radio Experiments in Milan

An important Company of Wireless Telegraphy of the country, during the month of May in Milan, will perform the experiments of transmission and reception between a direct Aerostatic and some flying airplanes.

The Wireless Station will be established in a stand of the Fiat and another in an Aerostatic of the Dornier. Moreover, some messages will be transmitted by radiotelegraph between airplanes while in flight.

Balloon Race in Milan

Under the auspices of the South Aeronautics Italian of Milan and under the patronage of the Federazione Aeronautica Nazionale Italiana and the War Ministry, an international race for balloons will take place in Milan on June 2 and 3, 1923. The prizes amount to \$1,250,000.

A few months ago a fire burnt out the interior of the Chapel of the Cathedral of Lodi, which is dedicated to the patronage of aviation. The work of restoration is nearly finished and the new image of the Virgin Mary, carved in oak-wood in the likeness of the original one, will be taken into St. Peter's, where it will be blessed and crowned by the Pope, whereas it will be carried back to Lodi by an airplane.

Kentucky Encourages Aviation

That the State of Kentucky is full representative of the important role stated for aviation in the economic and industrial life of the country is manifested by the recent action of the State Legislature in passing a resolution requesting all towns and cities in the Blue Grass State to spend in larger letters and more in the near future the sum of \$100,000 for the purpose of the State of Kentucky to be able to observe by aviation passing over each town and city.

Capt. Harry B. Plummer, A.S., stationed at Camp Knott, Ky., is directly responsible for the introduction and passage of this resolution. This effort is also endeavoring to work up interest in aviation in the other states of the Fifth Corps Area, in order to have a similar resolution passed. Officers stationed at Goddard Field, Camp Knott, Ky., are stationed at various localities throughout Kentucky, and the State is taking a very serious interest in the development of aviation.

The resolution, as passed by the Commonwealth of Kentucky, is as follows:

Whereas much interest is being taken in the subject of aviation, especially in the subject of carrying the mails by such method, and

Whereas aviation experience much difficulty in ascertaining the names of many towns and cities over which they are flying, and

Whereas there are but few material objects near the major towns and cities in the Commonwealth whereby such aviation is able to ascertain the names of such towns and cities, therefore

Be it resolved by the General Assembly of the Commonwealth of Kentucky:

That the names of all towns and cities in this Commonwealth are hereby requested to have painted on letters sufficiently large to be seen at a considerable distance, the name of their respective towns and cities upon the top of every building or structure in order that aviation is passing over each town and city may be able to ascertain readily the name of such town or city.

Section 2. That the Clerks of the Senate and the House of Representatives of the General Assembly of this Commonwealth be and they are hereby requested to cause to be printed, certified copies of this resolution addressed to the mayor of each town and city in this Commonwealth.

Lift and Drag Effects on Wing-Tip Rake

N. A. C. A. Report No. 140

This report by A. F. Zahm, R. M. Dear, and G. C. Hall, of the National Advisory Committee for Aeronautics deals with a description and report of tests carried out at the Washington Navy Yard on models of the HAFS, Albatross, and Sikorsky. It is intended to determine the effectiveness of the conventional wingtip rake in improving aerodynamic characteristics. Two degrees of rake were tested on each model; the trailing edge being always longer than the leading edge. The results are presented in tables and graphs in the standard form used at the time the tests were conducted.

A copy of Report No. 140 may be obtained upon request from the National Advisory Committee for Aeronautics.

Spain Wants Aircraft

The Aeronautical Chamber of Commerce is informed that the Minister of War in Spain has asked the Cabinet for an appropriation of the equivalent of \$25,000,000, for the construction of six Air Service, to include 240 airplanes plus the necessary reserve and equipment.

Herberto Alvarez, Spanish Club, Cincinnati, Ohio, is transmitting this information, stating: "I have been in aviation business for over thirty years and I am very interested in the success of my countrymen's efforts and I am very glad to see that they are so successful. I am in a very good position for doing business with the Spanish Government."

Foreign News

Italy.—A report giving the official record of the activities of the Civil Aeronautics Commission, C. A. I. A. M. (Italian Aeronautics Commission) for the year 1931, is as follows: On June 1, 1931, to Nov. 30, 1931, shows that during the latter period a total of 4194 passengers were carried without incident, the actual flying time being 1700 hr. 43 min. Strange as it may seem, a comparison of the figures for 1930 and 1931 shows that there was a falling off in traffic during the latter year. During the period from June 1 to Nov. 30, 1930, the number of flights totaled 777, and the number of passengers carried was 2016, while for the same period during 1931 the number of flights totaled 3715, and the number of passengers carried was 3601. As a matter of fact, the figures for the same months from June to November, 1930, when shown, were greater than the figures for the same months in 1931, since in the latter period the number of flights totaled 532 2/3 and the number of passengers carried was 1678. There was no flying in the month of December, 1930, and January and February, 1931, due to unfavorable atmospheric conditions.

The above company is in operation at the airfields of Ancona, Brindisi, Palermo, and Genoa, and at its principal stations at Rome, Florence, and Palermo.

England.—In order to speed up the delivery of mails to Paris from Manchester or other prominent towns in England, a night express service will shortly be inaugurated whereby parcels dispatched by passenger train after business hours from these towns will be collected by a special motor van from the London end and taken to the airport, and the parcels will be immediately thereafter put on board the night express carrying the London mail at 2:30 a. m. and scheduled to arrive at Paris at about 5:40 a. m. Upon arrival in Paris the parcels will be, by special arrangement, be passed through the French customs and delivered by motor van in Paris to such as business houses are open. A similar arrangement is to be instituted in connection with mails from provincial towns in France, whereby, by special arrangement, the parcels may be put in the morning and parcels sent from, say, Lyons or Lille, after business hours one evening will be delivered in London the following morning, or in Manchester or other towns in the afternoon.

The night express which are now being built will be equipped with instruments and navigation lights the night plane and, in connection with the illumination of the London to Paris service, some of the completed mail will be sent flying a safe and regular operation.

Denmark.—According to Flight (London) arrangements have been made for introduction of air mail service between Rotterdam and Copenhagen. The company which is to undertake the service is stated to be Danish, although it is intended to use British machines and pilots. The plan is to have machines leave Rotterdam in the morning, after the arrival of the mail boat from London, and it is expected that the service will be able to reach Copenhagen shortly after noon, so that the mails should be delivered early in the afternoon at that city. In the opposite direction machines will leave Copenhagen at 3:40 p. m. and will reach Rotterdam in time to connect with the night boat to London. That, instead of taking 72 hr., the route between London and Copenhagen should be the journey in about 24 hr.

The Netherlands.—The Royal Aerial Navigation Co. (K. L. M. airline) of the Netherlands carried during 1931 a total of 1548 metric tons of mail, valued over \$100,000, and 1674 passengers. The Amsterdam-London line carried for more than half of the mail and merchandise, carrying 844 tons of the former and 24,875 tons of the latter. In 1930, 824 metric tons of mail were transported by K. L. M. plus 254 tons on the Rotterdam-Brussels line. These figures disclose a marked increase over the 1929 volume of traffic, which totaled only 3 tons of mail, 25 tons of freight and 345 passengers.

ARMY AND NAVY AIR NEWS

Air Service

Chief of Air Service on Inspection Trip.—Major Gen. Mason M. Patrick, Chief of Air Service, Capt. Wm. John May, Jr., A. D. C., and Major H. M. Haskins returned to Washington on May 15 by airplane after a four day visit to New York and to inspect fields and aircraft plants in that vicinity. Captain Patrick visited General Pershing, and Major Haskins visited the other plane.

During the stopover in New York, these officers attended several meetings at Mitchell Field, and inspected several aircraft plants where Army work is in progress.

Air Tour for National Exhibition.—Army Air Corps Pilots at the several fields are going through tests and preliminary runs so that three teams can be selected to represent the Air Service at the National Exhibition at Milwaukee on May 31. Reports of the runs at the following fields have been made: Washington, D. C., at the following fields: Langley, Ross, Scott, Brooks, Knott and Aberdeen. The successful teams will be announced within a few days.

Report of Supply Equipment.—The Air Service is due at April 25, but has disposed of 3436 airplanes, and 9660 machine bodies spare parts and miscellaneous equipment for \$2,037,467.68, the estimated war-gain cost being \$28,441,139.03. By disposing of this equipment the Air Service has realized approximately 5 per cent. It is said that, on the plane and engine are surplus equipment about two years in age, the Army branch of the Army has done well to clean house of so much of its surplus material and spare parts for the service. For April 1, 1931 reports and four years were sold, the largest having been sold at a very low price.

Following is a list of all surplus airplanes and accessories reported sold by the Air Service:

Airplane	Value
Avro 504K	4
Aeronautics M1	2
Keegan	2
Standard J1	2
Standard J1B	2
Standard J1C	2
Standard J1D	2
Standard J1E	2
Standard J1F	2
Standard J1G	2
Standard J1H	2
Standard J1I	2
Standard J1J	2
Standard J1K	2
Standard J1L	2
Standard J1M	2
Standard J1N	2
Standard J1O	2
Standard J1P	2
Standard J1Q	2
Standard J1R	2
Standard J1S	2
Standard J1T	2
Standard J1U	2
Standard J1V	2
Standard J1W	2
Standard J1X	2
Standard J1Y	2
Standard J1Z	2
Standard J2A	2
Standard J2B	2
Standard J2C	2
Standard J2D	2
Standard J2E	2
Standard J2F	2
Standard J2G	2
Standard J2H	2
Standard J2I	2
Standard J2J	2
Standard J2K	2
Standard J2L	2
Standard J2M	2
Standard J2N	2
Standard J2O	2
Standard J2P	2
Standard J2Q	2
Standard J2R	2
Standard J2S	2
Standard J2T	2
Standard J2U	2
Standard J2V	2
Standard J2W	2
Standard J2X	2
Standard J2Y	2
Standard J2Z	2
Standard J3A	2
Standard J3B	2
Standard J3C	2
Standard J3D	2
Standard J3E	2
Standard J3F	2
Standard J3G	2
Standard J3H	2
Standard J3I	2
Standard J3J	2
Standard J3K	2
Standard J3L	2
Standard J3M	2
Standard J3N	2
Standard J3O	2
Standard J3P	2
Standard J3Q	2
Standard J3R	2
Standard J3S	2
Standard J3T	2
Standard J3U	2
Standard J3V	2
Standard J3W	2
Standard J3X	2
Standard J3Y	2
Standard J3Z	2
Standard J4A	2
Standard J4B	2
Standard J4C	2
Standard J4D	2
Standard J4E	2
Standard J4F	2
Standard J4G	2
Standard J4H	2
Standard J4I	2
Standard J4J	2
Standard J4K	2
Standard J4L	2
Standard J4M	2
Standard J4N	2
Standard J4O	2
Standard J4P	2
Standard J4Q	2
Standard J4R	2
Standard J4S	2
Standard J4T	2
Standard J4U	2
Standard J4V	2
Standard J4W	2
Standard J4X	2
Standard J4Y	2
Standard J4Z	2
Standard J5A	2
Standard J5B	2
Standard J5C	2
Standard J5D	2
Standard J5E	2
Standard J5F	2
Standard J5G	2
Standard J5H	2
Standard J5I	2
Standard J5J	2
Standard J5K	2
Standard J5L	2
Standard J5M	2
Standard J5N	2
Standard J5O	2
Standard J5P	2
Standard J5Q	2
Standard J5R	2
Standard J5S	2
Standard J5T	2
Standard J5U	2
Standard J5V	2
Standard J5W	2
Standard J5X	2
Standard J5Y	2
Standard J5Z	2
Standard J6A	2
Standard J6B	2
Standard J6C	2
Standard J6D	2
Standard J6E	2
Standard J6F	2
Standard J6G	2
Standard J6H	2
Standard J6I	2
Standard J6J	2
Standard J6K	2
Standard J6L	2
Standard J6M	2
Standard J6N	2
Standard J6O	2
Standard J6P	2
Standard J6Q	2
Standard J6R	2
Standard J6S	2
Standard J6T	2
Standard J6U	2
Standard J6V	2
Standard J6W	2
Standard J6X	2
Standard J6Y	2
Standard J6Z	2
Standard J7A	2
Standard J7B	2
Standard J7C	2
Standard J7D	2
Standard J7E	2
Standard J7F	2
Standard J7G	2
Standard J7H	2
Standard J7I	2
Standard J7J	2
Standard J7K	2
Standard J7L	2
Standard J7M	2
Standard J7N	2
Standard J7O	2
Standard J7P	2
Standard J7Q	2
Standard J7R	2
Standard J7S	2
Standard J7T	2
Standard J7U	2
Standard J7V	2
Standard J7W	2
Standard J7X	2
Standard J7Y	2
Standard J7Z	2
Standard J8A	2
Standard J8B	2
Standard J8C	2
Standard J8D	2
Standard J8E	2
Standard J8F	2
Standard J8G	2
Standard J8H	2
Standard J8I	2
Standard J8J	2
Standard J8K	2
Standard J8L	2
Standard J8M	2
Standard J8N	2
Standard J8O	2
Standard J8P	2
Standard J8Q	2
Standard J8R	2
Standard J8S	2
Standard J8T	2
Standard J8U	2
Standard J8V	2
Standard J8W	2
Standard J8X	2
Standard J8Y	2
Standard J8Z	2
Standard J9A	2
Standard J9B	2
Standard J9C	2
Standard J9D	2
Standard J9E	2
Standard J9F	2
Standard J9G	2
Standard J9H	2
Standard J9I	2
Standard J9J	2
Standard J9K	2
Standard J9L	2
Standard J9M	2
Standard J9N	2
Standard J9O	2
Standard J9P	2
Standard J9Q	2
Standard J9R	2
Standard J9S	2
Standard J9T	2
Standard J9U	2
Standard J9V	2
Standard J9W	2
Standard J9X	2
Standard J9Y	2
Standard J9Z	2
Standard J0A	2
Standard J0B	2
Standard J0C	2
Standard J0D	2
Standard J0E	2
Standard J0F	2
Standard J0G	2
Standard J0H	2
Standard J0I	2
Standard J0J	2
Standard J0K	2
Standard J0L	2
Standard J0M	2
Standard J0N	2
Standard J0O	2
Standard J0P	2
Standard J0Q	2
Standard J0R	2
Standard J0S	2
Standard J0T	2
Standard J0U	2
Standard J0V	2
Standard J0W	2
Standard J0X	2
Standard J0Y	2
Standard J0Z	2

Engine

Albion 50 hp.	5
Albion 60 hp.	5
Albion 70 hp.	5
Albion 80 hp.	5
Albion 90 hp.	5
Albion 100 hp.	5
Albion 110 hp.	5
Albion 120 hp.	5
Albion 130 hp.	5
Albion 140 hp.	5
Albion 150 hp.	5
Albion 160 hp.	5
Albion 170 hp.	5
Albion 180 hp.	5
Albion 190 hp.	5
Albion 200 hp.	5
Albion 210 hp.	5
Albion 220 hp.	5
Albion 230 hp.	5
Albion 240 hp.	5
Albion 250 hp.	5
Albion 260 hp.	5
Albion 270 hp.	5
Albion 280 hp.	5
Albion 290 hp.	5
Albion 300 hp.	5
Albion 310 hp.	5
Albion 320 hp.	5
Albion 330 hp.	5
Albion 340 hp.	5
Albion 350 hp.	5
Albion 360 hp.	5
Albion 370 hp.	5
Albion 380 hp.	5
Albion 390 hp.	5
Albion 400 hp.	5
Albion 410 hp.	5
Albion 420 hp.	5
Albion 430 hp.	5
Albion 440 hp.	5
Albion 450 hp.	5
Albion 460 hp.	5
Albion 470 hp.	5
Albion 480 hp.	5
Albion 490 hp.	5
Albion 500 hp.	5
Albion 510 hp.	5
Albion 520 hp.	5
Albion 530 hp.	5
Albion 540 hp.	5
Albion 550 hp.	5
Albion 560 hp.	5
Albion 570 hp.	5
Albion 580 hp.	5
Albion 590 hp.	5
Albion 600 hp.	5
Albion 610 hp.	5
Albion 620 hp.	5
Albion 630 hp.	5
Albion 640 hp.	5
Albion 650 hp.	5
Albion 660 hp.	5
Albion 670 hp.	5
Albion 680 hp.	5
Albion 690 hp.	5
Albion 700 hp.	5
Albion 710 hp.	5
Albion 720 hp.	5
Albion 730 hp.	5
Albion 740 hp.	5
Albion 750 hp.	5
Albion 760 hp.	5
Albion 770 hp.	5
Albion 780 hp.	5
Albion 790 hp.	5
Albion 800 hp.	5
Albion 810 hp.	5
Albion 820 hp.	5
Albion 830 hp.	5
Albion 840 hp.	5
Albion 850 hp.	5
Albion 860 hp.	5
Albion 870 hp.	5
Albion 880 hp.	5
Albion 890 hp.	5
Albion 900 hp.	5
Albion 910 hp.	5
Albion 920 hp.	5
Albion 930 hp.	5
Albion 940 hp.	5
Albion 950 hp.	5
Albion 960 hp.	5
Albion 970 hp.	5
Albion 980 hp.	5
Albion 990 hp.	5
Albion 1000 hp.	5
Albion 1010 hp.	5
Albion 1020 hp.	5
Albion 1030 hp.	5
Albion 1040 hp.	5
Albion 1050 hp.	5
Albion 1060 hp.	5
Albion 1070 hp.	5
Albion 1080 hp.	5
Albion 1090 hp.	5
Albion 1100 hp.	5
Albion 1110 hp.	5
Albion 1120 hp.	5
Albion 1130 hp.	5
Albion 1140 hp.	5
Albion 1150 hp.	5
Albion 1160 hp.	5
Albion 1170 hp.	5
Albion 1180 hp.	5
Albion 1190 hp.	5
Albion 1200 hp.	5
Albion 1210 hp.	5
Albion 1220 hp.	5
Albion 1230 hp.	5
Albion 1240 hp.	5
Albion 1250 hp.	5
Albion 1260 hp.	5
Albion 1270 hp.	5
Albion 1280 hp.	5
Albion 1290 hp.	5
Albion 1300 hp.	5
Albion 1310 hp.	5
Albion 1320 hp.	5
Albion 1330 hp.	5
Albion 1340 hp.	5
Albion 1350 hp.	5
Albion 1360 hp.	5
Albion 1370 hp.	5

Michael Field—Rear Gen. William Mitchell, Assistant Chief of Air Service, accompanied by First Lieut. J. J. Manning and Capt. J. H. Manning, Field 22 from Butler, Pa., arrived April 21. The General spent several days at Mitchell Field and vicinity inspecting the sites of several aircraft corporations. He flew to all existing airbases, among them the plant of the Thomas-Morse Aircraft Corp., Hones, N. Y., and the Williams Aircraft Corp., at Bushong Heights, N. Y. General Mitchell announced over the Air Service's Ball on the radio, Monday, April 23, and returned to Butler, Pa., on Wednesday.

Captain Malesky, U.S.M.C., has arrived at Mitchell Field and is awaiting Landing Force, as task unit for the MBT. Immediately upon his arrival and shortly after noon, Captain Malesky has flown this little plane. For the past few days he has been taking it over the mission course in an effort to determine its maximum speed. The course over which this plane has been flown has over a portion of two neighboring villages, Garden City and Westbury. Captain Malesky has flown the plane rather low in order that he might stay directly over his pylons and not miss them on the course.

PLAN

Baltimore Air Meet, May 30

Every year since the close of the War the Baltimore Flying Club has held an aviation meet or as it is now called, an Exhibition of Aircraft. Each year's meet so far has proven to be a bigger success than the last. In 1919 there were hardly a half dozen ships on the field; in 1920 there were twelve or fourteen and the meet lasted an entire week. This, however, did not prove satisfactory for in 1921 the Club went back to the single day meet and drew the largest crowd they had up to



Roy Page, president of the Lincoln Standard Aircraft Corp.

that time, while the exhibiting ships numbered about twenty-five, including commercial planes, sport planes, Army planes and National Guard planes.

A departure is to be made this year in having an event for water ships, that is, seaplanes and flying boats. This is easily possible for Logan Field, as the Club's beautiful and well kept airdrome is within a few hundred yards of the Patuxent River, a wide and well protected landing harbor.

The principal event, however, will be for land planes and the contests will be divided into four classes: (1) for commercial planes designated as ships carrying useful load of 750 lb. or more; (2) for sport planes which includes all one, two and three seaters; (3) for service pilots, Army pilots, Navy pilots and Marine Corps pilots and (4) for National Guard pilots. For the first time prizes will be awarded, but they will not be for speed or high altitude but rather for efficient design and precision flying. This does not mean there will be no speed races, for there will be several, but rather that speed will be secondary to speed range.

It is expected that practically all the entrants at the New York Spring Flying Meet will participate in the Baltimore event, and a number of additional commercial entries will be received from the middle west.

Mechanics' Summer Course

American Airways, Inc., of College Point, Long Island, announce a summer course for air mechanics beginning June 1, at a special low rate. This company has an excellent staff of instructors and gives thorough courses in engine assembly, mechanics and overhaul; rigging; wing construction and covering; theory of flight, ignition and elementary radio.

The American Airways shops are located directly on Flushing Bay with quick transit facilities to the New York business and residential sections.

Where to Fly

CALIFORNIA

SAN FRANCISCO, CALIFORNIA
EARL P. COOPER AIRPLANE & MOTOR CO.

ILLINOIS

PARTRIDGE, Inc.
Aeronautical Instruction
Aero Club of Illinois
Field, Chicago, Ill. Mail Address--
430 S. Michigan Ave.
Write for Booklet

INDIANA

One of the largest and best equipped flying fields
in the United States.
CURTISS-INDIANA COMPANY
Kokomo, Indiana
ALL TYPES OF CURTISS PLANES.

MARYLAND

Logan Field, 5 miles S. E. of Baltimore
All branches of Commercial Aviation,
Shops, Hangars and efficient Field Service.
AMERICAN AIRCRAFT Inc., Station F, Box 104, Baltimore, Md.

MASSACHUSETTS

BOSTON AND SPRINGFIELD, MASS.
EASTERN AIRCRAFT CORP.
340 FIRST ST., BOSTON, MASS.

MINNESOTA

WHITE BEAR LAKE, MINN.
The Twin Cities' chief summer resort.
Harold G. Peterson Aircraft Company
SCHOOL OF AVIATION

NEW JERSEY

NEW YORK AIR TERMINAL
800 Acres - 6 miles from Times Square.
Learn on ships that cannot tail spin. Planes rented \$30. hr.
CHAMBERLIN AIRCRAFT
Hastbrack Heights, N. J.

NEW YORK & NEW JERSEY

CURTISS FIELD, GARDEN CITY, LONG ISLAND
KENILWORTH FIELD, BUFFALO, N. Y.
FLYING STATION, ATLANTIC CITY, N. J.
CURTISS AEROPLANE & MOTOR CORPORATION

NEW YORK

AEROMARINE AIRWAYS, INC.
Times Building, New York
11 Passenger Flying Cruisers -- 5 passenger, open and
enclosed Flying Boats. Sightseeing Tours - Flights to Shore
and Lake Resorts

OHIO

DAYTON, OHIO.
Supplies, Hangars, Shops and Field 1 Mile from Dayton limits.
JOHNSON AIRPLANE & SUPPLY CO.

PENNSYLVANIA

Flying School and Commercial Aviation
Send for Circular
Official Flying field Aero Club of Pennsylvania
PHILADELPHIA AERO-SERVICE CORPORATION
636 Real Estate Trust Building, Philadelphia.

WISCONSIN

CURTISS-WISCONSIN AEROPLANE CO.
FLYING SCHOOL
Milwaukee Air Port
GILLES E. WEISENHEIMER
230 Clinton Street Milwaukee, Wis.

If you are one of the companies in your state having first class facilities for passenger carrying, pilots' training and special flights, you should be represented in WHERE TO FLY each week.

26 Consecutive Insertions \$20.00